

Claims

1. A DME fuel supply device for a diesel engine, comprising:
 - an injection pump for delivering DME fuel supplied from a fuel tank via a feed pipe in a specified amount to an injection pipe in communication with a fuel injection nozzle of a diesel engine at specified timing;
 - an oil separator for separating DME fuel mixed with lubricating oil in a cam chamber of the injection pump from the lubricating oil;
 - a communication passage adapted to retrieve DME fuel separated by the oil separator to said fuel tank;
 - suction means disposed in the communication passage for pumping a vapor phase part in said cam chamber via said oil separator;
 - cam chamber pressure regulating means disposed between said suction means disposed in said communication passage and said oil separator for maintaining the pressure in said cam chamber at a specified pressure or above;
 - a bypass passage routed around the cam chamber pressure regulating means and directly communicating said cam chamber and said suction means; and
 - bypass passage opening means for opening the bypass passage.
2. The DME fuel supply device for a diesel engine according to Claim 1, further comprising:
 - cam chamber state detecting means for detecting at least one of the viscosity of lubricating oil in said cam chamber, the concentration of lubricating oil in said cam chamber, the pressure in said cam chamber, and the temperature in said cam chamber; and
 - bypass controlling means for controlling said bypass passage opening means to be ON when the detection value detected by the cam chamber state detecting means exceeds a predetermined allowable value.
3. The DME fuel supply device for a diesel engine according to Claim 2, wherein said bypass passage opening means is controlled to be OFF when the detection value detected by said cam chamber state detecting means achieves a predetermined allowable value or below.

4. The DME fuel supply device for a diesel engine according to Claim 2 or 3, wherein said bypass controlling means controls said bypass passage opening means to be OFF when the detection value detected by said cam chamber state detecting means exceeds a predetermined allowable value and then a specified period of time elapses.
5. The DME fuel supply device for a diesel engine according to Claim 1 or 2, further comprising regular intervals bypass controlling means for controlling said bypass passage opening means to be ON and OFF for a specified period of time at predetermined intervals.
6. The DME fuel supply device for a diesel engine according to Claim 1 or 2, wherein said injection pump has an injection pump element for pressurizing and delivering said DME fuel in a fuel gallery supplied via said feed pipe from said fuel tank in a specified amount to an injection pipe in communication with a fuel injection nozzle of a diesel engine at specified timing through a delivery valve which can be opened and closed by up-and-down movement of a plunger in engagement with a camshaft rotated by rotation transmitted from a driving shaft of said diesel engine, the injection pump element having a DME fuel vaporizing portion with a gap formed in the sliding contact surface of a plunger barrel receiving said plunger with the plunger and adapted to reduce in pressure and vaporize said DME fuel in a liquid state leaked between the sliding contact surfaces of said plunger and said plunger barrel from said fuel gallery and the top of said plunger toward said cam chamber, before flowing into said cam chamber.
7. The DME fuel supply device for a diesel engine according to Claim 6, wherein said gap of said injection pump is formed by an annular groove formed circumferentially in the peripheral surface of said plunger.
8. The DME fuel supply device for a diesel engine according to Claim 6, wherein said gap of said injection pump is formed by an annular groove formed circumferentially in the inner peripheral surface of said plunger barrel.
9. The DME fuel supply device for a diesel engine according to Claim 7 or 8, wherein said DME fuel vaporizing portion of said injection pump has a

plurality of said annular grooves.

10. The DME fuel supply device for a diesel engine according to Claim 6 or 7, wherein said DME fuel vaporizing portion of said injection pump has said gap formed in the sliding contact surface of said plunger barrel with said plunger on the side of said cam chamber.

11. The DME fuel supply device for a diesel engine according to Claim 1, 2 or 6, having a configuration such that said DME fuel delivered from said injection pump is supplied to a common rail, from which said DME fuel is delivered to the fuel injection nozzle.

12. An injection pump of the DME fuel supply device for a diesel engine, having an injection pump element for pressurizing and delivering said DME fuel in a fuel gallery supplied via a feed pipe from a fuel tank in a specified amount to an injection pipe in communication with a fuel injection nozzle of a diesel engine at specified timing through a delivery valve which can be opened and closed by up-and-down movement of a plunger in engagement with a camshaft rotated by rotation transmitted from a driving shaft of said diesel engine,

said injection pump element having a DME fuel vaporizing portion with a gap formed in the sliding contact surface of a plunger barrel receiving said plunger with the plunger and adapted to reduce in pressure and vaporize said DME fuel in a liquid state leaked between the sliding contact surfaces of said plunger and said plunger barrel from said fuel gallery toward a cam chamber, before flowing into said cam chamber.

13. The injection pump according to Claim 12, wherein said gap is formed by an annular groove formed circumferentially in the peripheral surface of said plunger.

14. The injection pump according to Claim 12, wherein said gap is formed by an annular groove formed circumferentially in the inner peripheral surface of said plunger barrel.

15. The injection pump according to Claim 13 or 14, wherein said DME fuel

vaporizing portion has a plurality of said annular grooves.

16. The injection pump according to Claim 12 or 13, wherein said DME fuel vaporizing portion has said gap formed in the sliding contact surface of said plunger barrel with said plunger on the side of said cam chamber.

17. The DME fuel supply device for a diesel engine provided with the injection pump according to Claim 12 or 13.